Field evaluation of *Goniozus nephantidis* (Muesebeck) against coconut black-headed caterpillar in Kerala using different release techniques

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ABSTRACT: Many entomophagous insects attack the black-headed caterpillar of coconut, *Opisina arenosella* Walker during its developmental stages. *Goniozus nephantidis* (Muesebeck) is a gregarious larval parasitoid of *O. arenosella*. During summer months of 2003-04 and 2004-05 the parasitoid was evaluated in the field in Kerala by following two methods - trunk and crown release that were compared with control. There was significant reduction in the population of *O. arenosella* after third to sixth releases in treated palms, when compared to control palms. There was no significant difference between the two methods of release of *G. nephantidis* in reducing the population of *O. arenosella*. Hence farmers could easily and effectively adopt the trunk release method.


INTRODUCTION

The black-headed caterpillar, *Opisina arenosella* Walker is attacked by many entomophagous insects during its developmental stages. *Goniozus nephantidis* (Muesebeck) is a gregarious larval parasitoid of *O. arenosella*. The details of behaviour and life history have been published by Remadevi *et al.* (1978).

The per cent parasitism by *G. nephantidis* on *O. arenosella* varies from place to place. It has been reported 3.7 to 47.6 in Kerala (Sathiamma *et al.*, 1996) and 48.00 in Karnataka (Natarajan and Channabasavanna, 1980). Sathiamma *et al.* (1987) standardized the dosage of release of the parasitoid in Kerala and Venkatesan *et al.* (2003) standardized the method of release from Karnataka. They found that 90-100 per cent of the parasitoids released on the trunk (1.2m height from the ground level) reached the crown of the palm irrespective of the height of the tree. The mean time taken by each batch of the parasitoid varied from 13 to 22 minutes.

In Kerala, coconut climbing is very expensive, due to non-availability of climbers and the farmers are very reluctant to adopt the pest management...
Table 1. Reduction in O. arenosella population after release of G. nephantidis (2003-04)

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<tr>
<th>Treatment</th>
<th>Percentage reduction in Opisina population</th>
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<tbody>
<tr>
<td></td>
<td>After I release</td>
</tr>
<tr>
<td>T1- Release of 10 females at 1.2-1.5m height of palm</td>
<td>73.7&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>T2- Release of 10 females at the crown</td>
<td>62.2&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>T3- Control</td>
<td>62.5&lt;sup&gt;a&lt;/sup&gt;</td>
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<tr>
<td>CV (%)</td>
<td>2.5</td>
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practices in the crown area due to this difficulty. G. nephantidis is a recommended larval parasitoid for O. arenosella management. In order to find out a suitable, easy and economical release method the two known methods were evaluated in Kerala condition.

MATERIALS AND METHODS

The field experiments were laid out during the months of October to March 2003-04 and 2004-05. The treatments were: release of 10 females/trunk at 1.2-1.5 meter height, release of 10 females/crown and a control. Ten uniformly infested trees were selected randomly as replications for each treatment. Pre-release sampling was done for each tree by collecting and examining 20 leaflets. Counted larvae, pupae and adult stages of the pest from each leaflet to arrive at the number of O. arenosella per leaflet. Six releases of the parasitoid were made at 15 days interval. Releases were made in the morning hours using cotton and camel hairbrush. Leaflet samples were drawn at 15 days interval. During 2003-04 the experiment was carried out in the coconut plantation of Bishop Palace, Thrissur and during 2004-05 at Vatanapilly beach area.

The percentage reduction in the pest population after each release in relation to pre count was computed. The data were subjected to square root transformation and analysis of variance.

RESULTS AND DISCUSSION

The results of first trial showed that there was no significant difference in the population of O. arenosella in different treatments after first and second releases of G. nephantidis. But after third, fourth, fifth and sixth releases of the parasitoid, the pest population came down and it was significantly low in the parasitoid released palms. However, there was no significant difference between the two methods of releases of G. nephantidis in reducing the population of the pest (Table 1).

The results of the second trial showed that there was no significant difference in the population of pest in different treatments after first release of G. nephantidis. But after second, third, fourth, fifth and sixth releases of the parasitoid, the population of Opisina came down and it was significantly low in the parasitoid released palms when compared to the control palms. There was no significant difference between the two methods of releases of G. nephantidis in reducing the population of O. arenosella (Table 2).

From the two years results, it can be concluded that after third release of the parasitoid, the pest population came down and it was significantly low in the parasitoid released palms when compared to control palms. The two methods of release were equally effective in the management of O. arenosella.

The reduction in pest population after the release of the parasitoid shows the efficiency of the parasitoid. Crown release is a time consuming and cumbersome process. It is expensive, especially in Kerala where it is difficult to get
Field evaluation of $G$. nephanidis against $O$. arenosella in Kerala using different release techniques

Table 2. Reduction in $O$. arenosella population after release of $G$. nephanidis (2004-05)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Percentage reduction in Opisina population after release</th>
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<tbody>
<tr>
<td></td>
<td>I release</td>
</tr>
<tr>
<td>T1-Release of 10 females at 1.2-1.5m height of palm</td>
<td>33.0&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>T2-Release of 10 females at the crown</td>
<td>13.5&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>T3-Control</td>
<td>24.7&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>CV (%)</td>
<td>28.3</td>
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</table>

climbers. This study corroborates the results of Venkatesan et al. (2003). They found that 90-100 per cent of the parasitoids released on the trunk reached the crown of the palm and reduced the pest population. The new method of trunk release at a height of 1.2-1.5 m from the ground level can be easily and effectively practised for the management of $O$. arenosella.

ACKNOWLEDGEMENT

The authors are grateful to the Project Directorate of Biological Control, Bangalore for the financial support and also for the supply of the biocontrol agent.

REFERENCES


